

## ME 195B Senior Design Project

Spring 2007

**Prerequisites:** ME 195A

Credit Units: 3 units, 9 hours laboratory

Class hours: Wednesday, 1430 – 1720 (but expect to commit at least 10 hrs/week to your project!)

Class code: See Schedule of Classes

Instructors/Meeting Room: Section 1 (23046): Prof. Agarwal, Room E135  
Section 2 (23048): Prof. Du, Room E192  
Section 3 (23050): Prof. Wang, Room E111  
Section 4 (27676): Prof. Hsu, Room E117

Office hrs: Check with your instructor

### **COURSE DESCRIPTION:**

Second half of a one-year team project carried out under faculty supervision. Project will proceed from problem definition to analysis, design and validation, experimentation including possible construction and testing.

**Required Text:** *Senior Design Project Manual 2006-2007*, edited by Dr. Fred Barez, MAE Department available at: <http://www.engr.sjsu.edu/bjfurman/courses/ME195/ME195pdf/ME195coursemanual.pdf>

**Grading (overall):** A letter grade will be assigned to each student by the section instructor at the end of the semester and will be based on evaluation of the following course requirements:

- (25%) Delivery of at least three presentations on achievements and timely progress
- (15%) Class and seminar/guest speaker attendance, quizzes, and assignments
- (45%) End-of-semester report and accomplishments
- (15%) Individual performance evaluation

### **Work Area:**

- **Do NOT** leave trash in the area. Hazardous materials are to be kept in safe containers.
- **Do NOT** leave equipment running unattended

**Safety:** **NO STUDENT IS PERMITTED TO WORK ALONE IN A WORK AREA WITH EQUIPMENT OR HAZARDOUS MATERIAL PRESENT.** Refer to the Safety Rules in your manual and posted in each Laboratory.

### **Academic Integrity**

Students in this course are expected to maintain high ethical standards in all matters pertaining to the course, including, but not limited to, examinations, homework, course assignments, presentations, writing, laboratory work, team work, treatment of class members, and behavior in class. Cheating and plagiarism are violations of the SJSU Policy on Academic Dishonesty (S98-1) and will not be tolerated in the class. Students are expected to have read the Policy, which is available at:

<http://www2.sjsu.edu/senate/S04-12.pdf>

Plagiarism is defined as, *the use of another person's original (not common-knowledge) work without acknowledging its source.*<sup>1</sup> Thus plagiarism includes, but is not limited to<sup>2</sup>:

<sup>1</sup> Definition adapted from "Defining and Avoiding Plagiarism: The WPA Statement on Best Practices," <http://www.ilstu.edu/~ddhesse/wpa/positions/WPAplagiarism.pdf>; and "What is Plagiarism?," <http://www.stanford.edu/dept/vpsa/judicialaffairs/students/plagiarism.sources.htm>.

<sup>2</sup> Adapted from, "Avoiding Plagiarism," [http://owl.english.purdue.edu/handouts/research/r\\_plagiar.html](http://owl.english.purdue.edu/handouts/research/r_plagiar.html).

- copying in whole or in part, a picture, diagram, graph, figure, etc. and using it in your work without citing its source
- using exact words or unique phrases from somewhere without acknowledgement
- putting your name on a report, homework, or other assignment that was done by someone else

Students are expected to familiarize themselves with how to avoid plagiarism. Several helpful resources can be found at:

<http://www.stanford.edu/dept/vpsa/judicialaffairs/students/plagiarism.sources.htm>

### **Course Goals**

The overall goals for the course are to:

1. Provide senior students a capstone experience in design from concept to fabrication and validation of the final product.
2. Familiarize students with general industry practices, such as planning, budgeting, part procurement, fabrication, assembly, and functional tests.
3. Develop students' creative abilities in solving open-ended design problems.
4. Develop students' engineering judgment as well as their confidence in making and accepting responsibility for design decisions.
5. Develop students' oral and written communication skills necessary to describe the assumptions, methods, and results of engineering analysis, synthesis, and decision making associated with their design
6. Make students aware of the importance of teamwork in the design of products and provide them with an opportunity to develop team and leadership skills.
7. Develop students' understanding of professional practices, engineering ethics, as well as global and societal issues.

### **Learning Objectives for ME 195**

By the end of the course each student should be able to:

#### *Design Skills*

1. Apply the complete product development process including:
  - Defining the problem/societal need, carrying out market study/economic and budget analyses
  - Developing a complete set of functional specifications the design solution must meet
  - Generating solution concepts
  - Selecting the most promising design concept using structured methodologies
  - Developing design models and/or drawings for prototype and final design components
  - Procuring, fabricating, and assembling prototype and final design hardware
  - Evaluating, testing, and analyzing prototype and final design components and systems
  - Identifying future modifications and improvements that could be made to the design based on test data
  - Writing a project report and making presentations
2. Develop a schedule and meet schedule and budget constraints.
3. Interact effectively with vendors, suppliers, and shop personnel.

*Communication Skills*

- 4. Write high quality design reports (i.e., using correct language and terminology, correct technical information, and professionally prepared graphs and tables).
- 5. Give clear, informative, technically correct oral presentations using professionally prepared visual aids

*Team Skills*

- 6. Work harmoniously and effectively on a team to complete a design project.

*Contemporary Issues*

- 7. List several examples of contemporary issues related to their project, and articulate a problem statement *or* position statement for each.
- 8. Identify possible solutions to these contemporary problems, as well as any limitations of such strategies.

*Global and Societal Issues*

- 9. Evaluate and describe accurately the environmental impact of your product.
- 10. Evaluate and describe accurately any environmental and economic tradeoffs of your product.
- 11. Evaluate and describe accurately the health, safety, and economic tradeoffs of your product.

*Engineering Ethics*

- 12. Demonstrates knowledge of the ASME code of ethics.
- 13. Given a job-related scenario that requires a decision with ethical implications, identify possible courses of action, discuss the pros and cons of each one, and decide on the best one.

***COURSE SCHEDULE***

**Week/Date      Subject**

1    1/24 (room E 189) Enrollment, course overview. Laboratory activity

<b>Assignment:</b> Review the <a href="#">ME 195 Course Manual</a> <b>Due next week:</b> TBD
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2    1/31 Individual section meetings with instructor. Laboratory activity.

<b>Due today:</b> TBD <b>Assignment:</b> TBD <b>Due next week:</b> Presentation #1
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3    2/7 Individual section meetings with instructor. Laboratory activity.

<b>Due today:</b> Presentation #1 <b>Assignment:</b> TBD <b>Due next week:</b> TBD
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4    2/14 (room E 189) **Guest speaker:** Katherine Kao Cushing, SJSU Department of Environmental Studies on Environmental and Social Impact. Laboratory activity.

<b>Due today:</b> TBD <b>Assignment:</b> Quiz #1 <b>Due next week:</b> TBD
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Week/Date      Subject

5 2/21 Individual section meetings with instructor. Laboratory activity.

**Due today:** TBD  
**Assignment:** TBD  
**Due next week:** TBD

6 2/28 No formal class meeting.

**Due today:** TBD  
**Assignment:** TBD  
**Due next week:** Presentation #2

7 3/7 Individual section meetings with instructor. Laboratory activity.

**Due today:** Presentation #2  
**Assignment:** TBD  
**Due next week:** TBD

8 3/14 Individual section meetings with instructor. Laboratory activity.

**Due today:** TBD  
**Assignment:** TBD  
**Due next week:** TBD

9 3/21 (room E 189) **Guest speaker:** Clemm Noernberg, CEO, Areias Systems, Inc. Engineering Economics. Laboratory activity.

**Due today:** TBD  
**Assignment:** Quiz #2  
**Due next meeting:** TBD

10 3/28 SPRING BREAK. No class meeting.

11 4/4 Individual section meetings with instructor. Laboratory activity.

**Due today:** TBD  
**Assignment:** TBD  
**Due next week:** Presentation #3

12 4/11 Individual section meetings with instructor. Laboratory activity.

**Due today:** Presentation #3  
**Assignment:** TBD  
**Due next week:** TBD

13 4/18 No formal class meeting.

**Due today:** TBD  
**Assignment:** TBD  
**Due next week:** Outline for Semester Report and Single-Page Project Summary

**Week/Date      Subject**

14 4/25 (room E 189) **Guest speaker:** TBD on Global and Societal Issues. Laboratory activity.

<b>Due today:</b> Outline for Semester Report and Single-Page Project Summary <b>Assignment:</b> Quiz #3 <b>Due next week:</b> TBD
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15 5/2 Individual section meetings with instructor. Laboratory activity.

<b>Due today:</b> TBD <b>Assignment:</b> TBD <b>Due next week:</b> Final Report
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16 5/9 Individual section meetings with instructor. Laboratory activity.

<b>Due today:</b> Final Report
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<b>Note:</b> This is the last class meeting of the semester before your presentation during Student Conference Day on <u>Friday, May 11, 2006</u> . Check with your instructor for details about your presentation.
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**Important Notes:**

1. The final report must include sections that specifically address the Ethical, Environmental, and Global/Societal implications and impacts of your work. The report must also include a section that details the financial aspects of your project. For example, at a minimum, this would include a listing of the costs of parts in the bill of material (BOM) for your prototype. If your project is oriented toward a product that could go into production, it would be appropriate to include a production cost estimate and rate of return analysis.
2. You must show a copy of your registration form for taking the EIT examination and a copy of the notification that you received from the California Board for Professional Engineers and Land Surveyors for your registration for the exam to your instructor by March 16, 2007. If you already took the exam, you can instead show your instructor the official results from the Board.